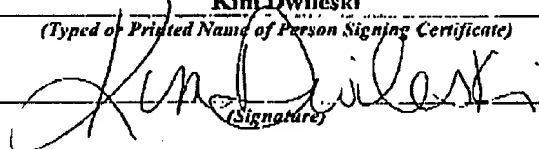


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CERTIFICATE OF TRANSMISSION BY FACSIMILE (37 CFR 1.8) Applicant(s): Agarwala et al.			Docket No. BUR92000021SUS1
Application No. 09/871,883	Filing Date 6/1/2001	Examiner Warren, Matthew E.	Group Art Unit 2815
Invention: DUAL-DAMASCENE METALLIZATION INTERCONNECTION (AS AMENDED)			
<p>I hereby certify that this <u>Reply Brief Responsive to Supplemental Examiner's Answer (10 pages)</u> <i>(Identify type of correspondence)</i></p> <p>is being facsimile transmitted to the United States Patent and Trademark Office (Fax. No. <u>571-273-8300</u>)</p> <p>on <u>9/28/2005</u> <i>(Date)</i></p> <div style="text-align: right; margin-top: 20px;"> <u>Kim Dwileski</u> <i>(Typed or Printed Name of Person Signing Certificate)</i>  <i>(Signature)</i> </div> <p style="text-align: center; margin-top: 40px;">Note: Each paper must have its own certificate of mailing.</p>			

SEP 28 2005

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Agarwala et al.

Docket No.: BUR920000215US1

Serial No.: 09/871,883

Group Art Unit: 2815

Filed: June 1, 2001

Examiner: Warren, Matthew E.

Title: DUAL-DAMASCENE METALLIZATION INTERCONNECTION (As Amended)

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY BRIEF RESPONSIVE TO SUPPLEMENTAL EXAMINER'S ANSWER

This Reply Brief addresses issues raised in the Supplemental Examiner's Answer mailed July 29, 2005 with respect to claims 32-35.

Claims 32-33

Claims 32-33 stand rejected under 35 U.S.C. §103(a) over Farrar (US 6,376,370 B1) in view of Otsuka et al. (US 6,1373, 136 B2).

With respect to claim 32, Appellants contend that Farrar in view of Otsuka does not teach or suggest the following feature of claim 32: "wherein said lower conductive liner on the side of said one or more dielectric pillars includes an upper edge having an inner surface, an outer surface, and a top surface and said upper conductive liner on the bottom of vias of said second portion of said array of vias contact one or more of said inner, outer and top surfaces to form said liner-to-liner contact region."

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In the Supplemental Examiner's Answer, the Examiner does not make a persuasive argument that Farrar in view of Otsuka teaches or suggests the preceding feature of claim 32. The Examiner argues only that "Farrar, disclosing the various wiring levels, was only deficient in disclosing dielectric pillars formed in the wiring lower level" and that "[when the references are combined, the lower conductive liner of Farrar would be on the side of the one or more dielectric pillars of Otsuka".

In response, Appellants contend that the preceding argument by the Examiner is misdirected, because the Examiner has not addressed the specific structural limitations in the preceding feature of claim 32 relating to the contact between "said upper conductive liner on the bottom of vias of said second portion of said array of vias" and the "one or more of said inner, outer and top surfaces" of the lower conductive liner on the side of said one or more dielectric pillars, "to form said liner-to-liner contact region".

Accordingly, Appellant contends that the Examiner has not established a *prima facie* case of obviousness in relation to claim 32, and the rejection of claim 32 should accordingly be reversed.

With respect to claim 33, Appellants contend that Farrar in view of Otsuka does not teach or suggest the following feature of claim 33: "wherein said liner-to liner contact region comprises first portions co-extensive with said lower conductive liner on portions of first sides of said dielectric pillars under said vias" (emphasis added).

In the Supplemental Examiner's Answer, the Examiner does not make a persuasive argument that Farrar in view of Otsuka teaches or suggests the preceding feature of claim 33.

The Examiner argues only that "Farrar, disclosing the various wiring levels, was only deficient in disclosing dielectric pillars formed in the wiring lower level" and that "[when the references are combined, the lower conductive liner of Farrar would be on the side of the one or more dielectric pillars of Otsuka".

In response, Appellants contend that the preceding argument by the Examiner is misdirected, because the Examiner has not addressed the specific structural limitations in the preceding feature of claim 33 relating to the liner-to liner contact region being "co-extensive" with the lower conductive liner on portions of first sides of the dielectric pillars under the vias.

Accordingly, Appellant contends that the Examiner has not established a *prima facie* case of obviousness in relation to claim 33, and the rejection of claim 33 should accordingly be reversed.

Moreover, with respect to claims 32 and 33, Appellant contends that the Examiner's reason for modifying Farrar by the alleged teaching of Otsuka is not persuasive. The Examiner argues: "Otsuka was cited to show that dielectric pillars were formed in a wiring level to improve structural integrity".

In response with respect to the Examiner's allegation of the use of pillars to improve structural integrity, Appellant notes Otsuka discloses that "residual patterns of the insulating film having a shape like a pillar are left in the peripheral area of the via hole to control the diameter of crystal grains in the wide wiring on the conductor of the via hole. The width of a wiring itself connected to the conductor in a via hole may be changed to control the crystal grain diameter" (emphasis added) (Otsuka, col. 11, lines 33-39).

Otsuka reveals that the ability of the pillars to control the diameter of the crystal grains is geometry sensitive and the use of the pillars have to be tuned to the geometry under consideration. See Otsuka, col. 12, lines 37-42 ("Since the width of the wiring is relatively narrow, insulating pillars made of residual patterns of the insulating film cannot be disposed completely along the second loop. The insulating pillars disposed only along the first loop may insufficiently control the diameter of crystal grains in the wiring near the via hole.").

Therefore, Appellants contend that it is not obvious to modifying Farrar by the alleged teaching of Otsuka, because: (1) there is no indicated need in Farrar to control the diameter of crystal grains in the lower level wiring of Farrar; and (2) due to the aforementioned geometric complexities, it is not obvious that the geometry of the lower level wiring lends itself to introducing pillars that would control the diameter of crystal grains in the lower level wiring; (3) Otsuka does not provide sufficient disclosure to enable the use of pillars to control the diameter of crystal grains in the lower level wiring of Farrar, which is quite different geometrically from the Otsuka's structure (i.e., one of ordinary skill in the art could not determine from the disclosure in Otsuka where to place the pillars in Farrar in order to control the diameter of crystal grains in the lower level wiring).

Based on the any of the preceding arguments, Appellant contends that claims 32-33 are not unpatentable over Farrar in view of in view of Otsuka, and the rejection of claims 32-33 under 35 U.S.C. §103(a) should accordingly be reversed.

Claims 34-35

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Claims 34 and 35 stand rejected under 35 U.S.C. §103(a) over Farrar et al. (US 6,376,370 B1) in view of Otsuka et al. (US 6,137,136 B2) and in further view of Havemann (US 6,156,651).

With respect to claims 34-35, Appellants contend that Farrar in view of Otsuka does not teach or suggest the following features of claims 34-35: “wherein said liner-to liner contact region further comprises second portions **co-extensive** with said lower conductive liner on portions of second sides of said dielectric pillars under said vias” (claim 34); and “wherein said liner-to-liner contact region further comprises a third portion **co-extensive** with said lower conductive liner on portions of third sides of said dielectric pillars under said vias” (claim 35) (emphasis added).

In the Supplemental Examiner’s Answer, the Examiner does not make a persuasive argument that Farrar in view of Otsuka teaches or suggests the preceding features of claim 34-35. The Examiner argues only that “Farrar, disclosing the various wiring levels, was only deficient in disclosing dielectric pillars formed in the wiring lower level” and that “[when the references are combined, the lower conductive liner of Farrar would be on the side of the one or more dielectric pillars of Otsuka”.

In response, Appellants contend that the preceding argument by the Examiner is misdirected, because the Examiner has not addressed the specific structural limitations in the preceding feature of claim 34-35 relating to the liner-to liner contact region being “**co-extensive**” with the lower conductive liner on portions of second and third sides of the dielectric pillars under the vias.

Accordingly, Appellant contends that the Examiner has not established a *prima facie* case of obviousness in relation to claim 33, and the rejection of claim 33 should accordingly be reversed.

Moreover, with respect to claims 34-35, Appellant contends that the Examiner's reason for modifying Farrar by the alleged teaching of Otsuka is not persuasive. The Examiner argues: "Otsuka was cited to show that dielectric pillars were formed in a wiring level to improve structural integrity".

In response with respect to the Examiner's allegation of the use of pillars to improve structural integrity, Appellant notes Otsuka discloses that "residual patterns of the insulating film having a shape like a pillar are left in the peripheral area of the via hole to control the diameter of crystal grains in the wide wiring on the conductor of the via hole. The width of a wiring itself connected to the conductor in a via hole may be changed to control the crystal grain diameter" (emphasis added) (Otsuka, col. 11, lines 33-39).

Otsuka reveals that the ability of the pillars to control the diameter of the crystal grains is geometry sensitive and the use of the pillars have to be tuned to the geometry under consideration. See Otsuka, col. 12, lines 37-42 ("Since the width of the wiring is relatively narrow, insulating pillars made of residual patterns of the insulating film cannot be disposed completely along the second loop. The insulating pillars disposed only along the first loop may insufficiently control the diameter of crystal grains in the wiring near the via hole.").

Therefore, Appellants contend that it is not obvious to modifying Farrar by the alleged teaching of Otsuka, because: (1) there is no indicated need in Farrar to control the diameter of

crystal grains in the lower level wiring of Farrar; and (2) due to the aforementioned geometric complexities, it is not obvious that the geometry of the lower level wiring lends itself to introducing pillars that would control the diameter of crystal grains in the lower level wiring; (3) Otsuka does not provide sufficient disclosure to enable the use of pillars to control the diameter of crystal grains in the lower level wiring of Farrar, which is quite different geometrically from the Otsuka's structure (i.e., one of ordinary skill in the art could not determine from the disclosure in Otsuka where to place the pillars in Farrar control the diameter of crystal grains in the lower level wiring).

In the Supplemental Examiner's Answer, the Examiner argues that the layer 48 of Havemann must be conductive, even though the Examiner acknowledges that the only material disclosed by Havemann as being comprised by layer 48 is silicon nitride which is electrically insulative. Thus, the Examiner is making a logically flawed argument, because the layer 48 cannot be conductive and yet contain the insulator silicon nitride. In other words, the Examiner is arguing for acceptance of a physical impossibility.

In the Supplemental Examiner's Answer, the Examiner continues to allege that Havemann teaches forming a contact "without mechanical defects" even though Havemann abstract referred to by the Examiner specifically recites: "Methods are shown for realizing desirable insulating and conducting layers without deleterious mechanical effects" (emphasis added). The Examiner has incorrectly concluded that a "defect" is equivalent to an "effect". Appellant maintains that a "defect" is "a fault or imperfection". *The Random House Common*

Dictionary 348 (revised ed. 1988). Appellant further maintains that an "effect" is "something that is produced by an agency or cause; result; consequence". *Id.* at 420. Therefore, the Examiner's argument for combining Havemann with Farrar, being based on an incorrect assumption as to what Havemann teaches, has no persuasive weight. Accordingly, Appellant contends that the Examiner has not established a *prima facie* case of obviousness in relation to claims 34-35, and the rejection of claims 34-35 should accordingly be reversed.

In addition, the Havemann disclosure does not provide any information as to what aspects of the Havemann methodology are responsible for realizing insulating and conducting layers without deleterious mechanical effects. Without this information one of ordinary skill in the art has no way of knowing which aspects of the Havemann methodology to import into Farrar in order to realize insulating and conducting layers without deleterious mechanical effects.

Furthermore, the Examiner has not identified anything in the Farrar disclosure that indicates that Farrar discloses forming insulating and conducting layers with deleterious mechanical effects. In other words, the only scenario making it obvious to modify Farrar with Havemann is a scenario in which Farrar is problematic due to forming insulating and conducting layers with deleterious mechanical effects, so that modifying Farrar with Havemann would improve the Farrar methodology. However, the Examiner has not only not produced evidence that Farrar is problematic in that manner, but the Examiner has not even considered the issue of whether Farrar is problematic in that manner. In other words, Appellant contends that it is not obvious to modify Farrar with Havemann to solve a non-existent problem in Farrar or to improve Farrar when no evidence has been produced to show that Farrar will be improved. Therefore, it would not be obvious to combine Farrar with Havemann, and the rejection of claims 34-35

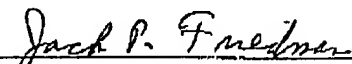
should be reversed.

Based on the any of the preceding arguments, Appellant contends that claims 34-35 is not unpatentable over Farrar in view of Havemann, and the rejection of claims 34-35 under 35 U.S.C. §103(a) should accordingly be reversed.

SUMMARY

In summary, Appellants respectfully request reversal of the 35 U.S.C. §103(a) rejection of claims 1-4, 6-13, 15-20, 22-25 and 27-35.

Respectfully submitted,



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